Make your Snow Machine Environmentally Friendly

In recent years, the burgeoning popularity of snow machines in and around Yelllowstone National Park has led to concerns about the possible environmental effects of this winter recreation. Winter use by snowmobilers in the park increased from 45,000 visitors in 1986 to about 85,000 in 1994, the most recent year of uninterrupted snowmobile use. The particular conditions in Yellowstone, including the dense, cold, often stable air, in combination with the specific emissions from snow machine engines, have the potential to produce unacceptable impacts to the environment.

Air Quality and Environmental Concerns

Both Park Service personnel and visitors have expressed concern about smoke, carbon monoxide, and odors of exhaust in areas of heavy snow machine use in Yellowstone. These problems are especially noticeable along roads to Old Faithful. Emissions from snow machines include carbon monoxide, hydrocarbons, particulate material, and a variety of gases classified as “air toxics.” Poor air quality detracts from the quality of visitor experience and can be a health hazard, especially to children, pregnant women, older people, and people with cardiovascular disease and impaired lung function such as asthma sufferers.

Why Snowmobiles?

The 2-cycle engines used in snow machines emit 20 to 33 percent of their fuel unburned. This emission includes lubrication oil, which is mixed in the fuel at a ratio of 50 parts gasoline to one part lube oil (50:1). Most of the visible haze in 2-cycle exhaust is from the lube oil. The dense stagnant air that characterizes Yellowstone in winter causes emitted pollutants to build up in the air along heavily used roads and in parking lots. Other contaminants, such as ammonia, resulting from 2-cycle engines are being found in the snow along roads, suggesting the possibility of water pollution when the snow melts.

Some Solutions

Emissions from snowmobiles can be minimized by keeping the engines tuned properly for the elevation where they are operating. The high altitude of Yellowstone, ranging from 6,600 to 8,500 feet along the roads traveled by snow machines, requires carburetor jets with smaller orifices than would be used at lower elevation. Use of the smaller jets results in more complete fuel combustion. Installation of proper jets for higher elevation also improves engine performance, and snowmobile clutches should be adjusted to match performance. These adjustments usually must be made by a qualified mechanic. Proper clutch adjustment also reduces fuel use and emission of pollutants.

Another promising method for reducing emissions is the use of oxygenated fuels and specially formulated lube oils. The oxygenated fuel used in Montana is a blend of 10 percent ethanol and 90 percent conventional gasoline. Use of oxygenated fuels reduces emissions of most harmful pollutants from gasoline engines in both snowmobiles and snowcoaches. Some manufacturers suggest adjusting jets when using 10 percent ethanol blend.

Manufacturers of low-emission 2-cycle oil combine various characteristics into their formulations. Testing funded by the Montana Department of Environmental Quality (DEQ) and others compared emission levels from a conventional petroleum-base lube oil to those from three oils formulated to improve performance and reduce emissions. These were: Conoco Bio-Synthetic 2-Cycle Engine Oil, which is highly biodegradable; Bombardier Rotax (Castrol) Formula XPS Synthetic Two-Stroke Oil (a synthetic biodegradable lube with solvent) which is biodegradable and produces lower particulate emissions; and TORCO Synthetic Smoke-Less 2-Cycle Oil, a fully synthetic lube oil that is low particulate but

not biodegradable. Biodegradable synthetic lube oils can be used interchangeably with standard oils.

Test results show that the use of synthetic low-particulate oils significantly reduces pollution. Synthetic biodegradable lube oils reduced carbon monoxide, and probably would reduce any potential impacts to water quality. Snowmobilers should check with their dealers, outfitters, and/or retailers for availability of these products, which will become more available in the near future. For more detailed information on the use of ethanol blend in your machine, see Understanding Ethanol in **Snowmobile** magazine, October 1997.

Making a Difference

Snowmobile and snowcoach rental operators in West Yellowstone are taking positive steps to protect air and water quality in and around Yellowstone Park. These private snowmachine operators and the Park Service will be using 10 percent ethanol blend in their machines this winter. In addition to using 10 percent ethanol blend, most snowmachine rental operators will be using synthetic lube oils and the Park Service will be using biodegradable lube oils. These combined efforts will reduce carbon monoxide and particulates and should reduce potential health hazards.

Service stations in West Yellowstone, Montana and Cody and Jackson, Wyoming are making oxygenated fuel available to the general public for all private vehicles. Snowmobilers in the Yellowstone area encourage visiting snowmobilers to join the effort and use oxygenated fuels and synthetic, low emission lube oils when in the area—and to spread the word when you return home.

A checklist to...

Make Your Snow Machine More Environmentally Friendly

- Ö use proper jets, keep engines tuned and clutches adjusted properly for the elevation where machines operate
- Ö use oxygenated fuels such as “10 percent ethanol blend” to reduce pollution
- Ö use synthetic low-particulate lube oils to reduce particulates and smoke
- Ö use synthetic biodegradable lube oils to reduce potential impacts to health and the environment
- Ö check with your dealers, outfitters, and/or retailers for availability of these and similar products.

For more detailed information and follow-up activities, see

www.deq.state.mt.us/ppa/biofuels/biofuels.htm

or contact the

Pollution Prevention Bureau

(406) 444-6697, *or e-mail* **hhaines@state.mt.us**

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Make your SNOW MACHINE more environmentally friendly

- **Adjust machines for local conditions and altitudes**
  - **Adjust clutches**
  - **Use proper jets**
  - **Keep engines tuned**
  - **Use:**
    - **Oxygenated fuels such as “10 percent ethanol blend” to reduce pollution**
    - **Synthetic low-particulate lube oils to reduce particulates and smoke**
    - **Synthetic biodegradable lube oils to reduce potential impacts to health and the environment**